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ABSTRACT

This document presents papers, critiques, and comments from a symposium which assessed the current status of preventive dental behavior. The field was divided into the following three major areas: (a) mass media programs, (b) school health programs, and (c) effect of the private practitioner. Each author was asked to review the literature, provide an assessment of the current state of knowledge, and suggest future research needs in his or her area. Members of the reactor panel were asked to respond from the vantage point of the application of behavioral science technology to preventive programs. One of the most striking outcomes of the program was acknowledgement of the communication gap between behavioral scientists and practicing dentists. Some dentists felt that behavioral scientists were withholding immediately applicable techniques, while others felt there was little to be obtained from such techniques. Many behavioral scientists felt that dentists did not appreciate or support their concern and efforts in this field. (Editor/PB)

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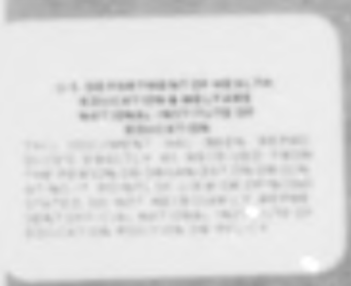
Health Education Monographs

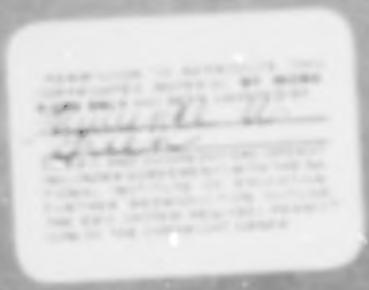
SYMPOSIUM ON DENTAL HEALTH BEHAVIOR

Norman Cook
Guest Editor

CONTRIBUTED PAPERS RELATED TO FAMILY PLANNING

CURRENT LITERATURE RELATED TO HEALTH EDUCATION





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The highest priority is given to manuscripts which contribute to knowledge of health behavior and draw implications for program planning and evaluation, and to those manuscripts which detail the application of behavioral research to health planning and social action. An effort is made to present both innovative research and practice in a format which encourages their usefulness to public health practitioners. The Editor especially welcomes papers concerned with the adaptation of health services to their consumer needs and with the development of individual and community initiative in achieving desired health goals, both preventive and curative.

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communication channels used to promote the "Dr. Dial" program.

The results of the six-week "Dr. Dial" program in Casper were measured in several ways. Data collected from the study showed that about 60 percent of the patients who visited their dentists during and after the project had either seen or heard announcements about the "Dr. Dial" program. More importantly, about 14 percent of the people who visited dental offices during and shortly after this period indicated that their visit had been prompted directly by the "Dr. Dial" program. Further, the 33,000 telephone calls received by "Dr. Dial" during the entire six weeks, or about 5500 calls per week, indicated that the program was highly effective in arousing public interest in dental health in general and periodontal disease in particular.

The results of the "Dr. Dial" program suggest that community projects can effectively motivate people to seek information regarding public health as well as prompting them to visit their dentists. This project was believed to be so successful, in fact, that similar programs are being considered or have been initiated in other communities.[5]

National Dental Health Education

Mass media have also been used at the national level to help promote dental health education. An outstanding example of a program of this type is the television spot announcement campaign sponsored by the American Dental Association.[6] During the past ten years, the Association has been providing 30-second and 60-second films on dental topics for use on television. At present, these films are mailed periodically to over 480 television stations throughout the nation.

This program utilizes the availability of free television public service time to convey its message. It is estimated that approximately ten million dollars of free television time is donated annually to this program.[2,6] While the effectiveness of this program in changing the dental health behavior of the general population has not been measured, the wide exposure given to this program over the past ten years would seem to assure some measure of success at least at the cognitive or attitudinal level.

Mass media have also been used on a national basis during Children's Dental Health Week to help promote dental education.[1] During this period, national exposure to dental health information has been provided by children's television shows and by major magazine and syndicated news column coverage of such topics as the current status of fluoridation and the importance of healthy teeth. Further, interviews concerning dental disease have also been aired on national radio networks. While the effects of this annual program have not been definitively measured, the Children's Dental Health Week program has disseminated much dental health information to the public in general, and to children in particular.

Commercial Product Messages

Since it is generally difficult to quantify values such as personal attitudes or habits, it is hard to determine the effectiveness of mass media in changing these values. If a value change in attitude or habit can be linked to some other response such as a product purchase, however, product sales can give an indication of a change in value. For this reason, the impact of commercial advertisements for dental products can give some insight into the ability of mass media to help shape dental health behavior.

One example of how commercial product messages have directly helped to influence dental health behavior is the public acceptance and use of fluoridated toothpastes. Since the mid-50's when these toothpastes were first introduced, mass media have been used as the major communications source to convince the public that fluoridated toothpastes are more effective in reducing cavities. The results of these commercial product messages are two-fold. First, the public has generally accepted the fact that fluoridated toothpastes are more effective in reducing cavities. Second, fluoridated toothpastes account for about two thirds of all toothpaste sold today. The shift to fluoridated toothpastes represents a substantial change in the public's dental health preferences with regard to their purchase choices. The use of mass media must therefore be considered instrumental in convincing people of the value of using these toothpastes, thereby bringing about widespread dental health benefits to the general public.

An example of how commercial product messages have indirectly helped to influence dental health behavior can be seen in the increased per capita consumption of toothpaste from 1955 to 1970, as shown in Figure 1. Since the percentage of people using toothpaste and the quantity of toothpaste used per brushing is believed to have remained relatively constant over this period, this trend is most likely indicative of an increased frequency of toothbrushing of about 50 to 60 percent from 1955 to 1970. Obviously, factors other than toothpaste advertisements could also have helped bring about such a trend. Nevertheless, it is reasonable to believe that the aggregate effect of toothpaste advertising has helped to increase the frequency of brushing. It seems, therefore, that mass media, through commercial product messages for toothpaste, have indirectly influenced the dental health behavior of the public.

ELEMENTS OF SUCCESSFUL MASS MEDIA CAMPAIGNS

The preceding examples give us some idea how mass media have been useful in promoting dental health. They also highlight three elements which I believe must be integrated into a mass media campaign to assure its effectiveness in reaching the general public.

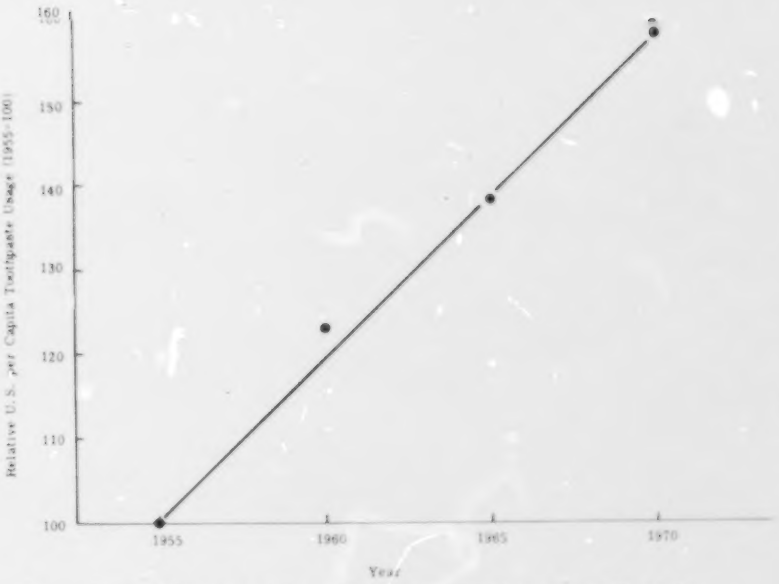

Figure 1. Trend of per capita toothpaste usage in the United States.

Conveying The Message

First, the communication itself must effectively convey the desired message. The manner in which the message is presented can importantly influence its impact on the general public. In a study conducted for the Food and Drug Administration regarding its OTC Drug Education Program, it was determined that public awareness of potential problems stemming from OTC drug misuse was low.[7] It was concluded that public awareness of the potential problems could be facilitated more readily through a direct message approach using a bold presentation of facts than by more subtle message approaches. It seems reasonable that a direct message approach would similarly offer the best means of reaching the public with dental health messages, since good dental health is not an everyday concern to most people.

It seems appropriate that most dental health messages promote preventive rather than curative dental measures. This requires, however, that the message recipients accept, more or less on faith, that the preventive measures are worth the effort. This emphasizes the fact that a dental message must be believeable if it is to have any impact. This includes both the believability of the message itself and the credibility of the source of the message.

In the previously mentioned study for the FDA, it was concluded that the direct message approach also increased the believability of the message. The same could reasonably be expected for dental health

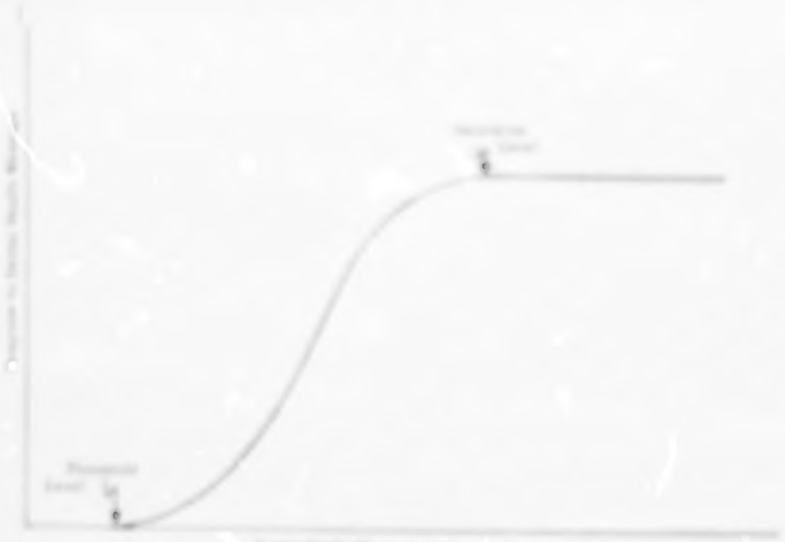

Figure 2. Response to dental health message exposure level

messages. The most credible and authoritative source of dental health information in the minds of the public is probably the American Dental Association. The fact that ADA product endorsement has helped influence the use of fluoridated toothpastes supports this contention.[5] It also seems reasonable that toothpaste advertisements have increased the public awareness of the ADA name, thereby reinforcing its credibility as an information source. ADA sponsorship of dental health messages therefore seems appropriate.

Level of Exposure

Second, the message must have an effective level of exposure in order to reach the public and bring about a significant change in dental health behavior. While the exact way in which mass media exposure works is not well understood, there are some basic assumptions regarding media exposure which are generally accepted as valid.[6]

One of these is the concept of a "threshold level" of exposure below which media messages are wasted. Stated in another way, the message will tend to be lost among the thousands of competing messages unless some minimum level of exposure is attained. At the other extreme is the concept of a "saturation level" beyond which additional exposure is wasted. Between these two extremes lies a range over which responses to media messages can be influenced by exposure level.

Using these basic concepts to describe dental health messages, the response to different media exposure levels can be depicted graphically by an S-shaped curve as shown in Figure 2. Since the attainment of a

Figure 1. Response to a dental health campaign as described in text.

saturation level is generally believed to require very high exposure, it is unlikely that this level has much significance in dental health campaigns. The threshold level is significant, however, unless this level is exceeded, the campaign will not make a contribution to improved dental health behavior.

To best achieve good dental health, proper dental health techniques should be practiced on a continuing basis. If a mass media program has succeeded in improving some aspect of dental health behavior, it is therefore important to assess whether this improvement will be sustained if the program is discontinued or redirected.

Borrowing from advertising dynamics studies conducted in other areas, the response to the dental health message built up during the mass media campaign will likely undergo a more-or-less logarithmic decay if the campaign is terminated.* This is described qualitatively in Figure 1. In fact, this implies that some level of continuing media effort will be necessary to sustain an improvement in dental health behavior. Since it is especially more difficult to bring about an improvement than to sustain it, the program should probably consist of two phases. The objective of the first phase would be to bring about improved behavior, and would emphasize media support to accomplish this. The objective of the second phase would be to sustain the improvement from the first. Since the second phase of the program should require lesser media support, other dental health mass media programs could then be initiated.

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whom medical and dental problems are likely to be particularly pronounced and for whom such beliefs would be desirable. It is important to recognize and take this point into account.

Preventively oriented dental health education programs likely to emphasize the kinds of factors that I just indicated are in short supply among a substantial segment of our population. Such an emphasis is, therefore, likely to receive little social support from the children's own social groups, including that of the family. Several studies have cited the importance of the parent's role, particularly that of the mother, in influencing children's health behavior.[10,19,20] A few research studies also attest to the impact of involving the parents on the overall success of dental health education efforts.[5,7] Yet school programs in dental health education all too often fail to make systematic use of this factor; they concentrate almost exclusively on children and in so doing make their task more difficult.

Another key source of social influence is that of the peer group, which is particularly important with teenagers.[15] Dental health education efforts in schools, however well conceived, will have difficulty in changing either dental health attitudes or behaviors if there is strong peer group pressure against them.

Transfer From School To Home

In addition to establishing supportive group standards, it is important that the classroom teaching be so done as to facilitate easy transfer to the home care setting and to maximize the likelihood that the newly changed behaviors will be retained rather than reverting to their former state. All too often, health educational efforts seem to have a sharply limited time dimension; this may account in large part for the failure to maintain over any appreciable period of time whatever gains have initially been realized. This seems to have at least two implications: First, the teaching of desired dental health practices needs to contain some components that will permit effective self-appraisal and self-reinforcement by the student in the home setting. Second, the educational efforts should be so paced as to involve follow-up and reinforcement by the school over time until the newly acquired habit is firmly established. The principles and techniques of behavior modification provide a promising approach to dealing with such problems.[21] It should be noted, however, that applying such techniques in a natural setting such as the school or home is substantially different from doing so in the research laboratory and should not be expected to produce automatic success.[17]

PROGRAM EVALUATION

One thing that appears to be generally lacking in school dental health educational efforts is systematic program evaluation.[16,22] I am aware, of

course, that *any* analysis of the outcome of a dental health education program that uses either a true control group or a comparison group represents an attempt at evaluation. What I'm talking about, though, goes beyond merely assessing whether the particular educational program produced an outcome different from that of some other program or of no program at all. That type of analysis fails to deal adequately with the program process and fails to yield information that is crucial for understanding program success or failure. Two of my colleagues, Deniston and Rosenstock, have devoted considerable effort to a conceptual analysis of the evaluation process and to the development and application of effective methods of evaluation based upon this formulation.[3] They emphasize the need for specifying the ultimate objectives of the program, the subobjectives whose attainment is needed to reach the ultimate objectives, the activities whose performance is necessary to attain a given subobjective, and the resources allocated to perform these activities.

Deniston and Rosenstock make two points that I would particularly like to emphasize: First, the performance of activities is not necessarily the same thing as the attainment of subobjectives; it is possible to perform the former without necessarily achieving the latter. This distinction is sometimes missed by program operators who confuse the one with the other. Second, some of the things that are done to achieve particular program subobjectives (and hopefully the ultimate objectives), rest on what they label "validity assumptions," i.e., assumptions that doing a particular thing will have a positive effect on a particular outcome. Sometimes these validity assumptions are demonstrably true, while other times the assumptions are based on faith not fact. If one's validity assumptions are incorrect, then performing apparently appropriate activities may fail to result in the attainment of desired subobjectives or ultimate objectives.

Let me illustrate this point by applying it to the evaluation of educational efforts. The ultimate objective to be attained by a dental health education program is, of course, a health outcome — i.e., improved oral health status. But it is not appropriate to evaluate the impact of the educational activities in terms of the ultimate health objective. Why not? Because implicit in the program is the validity assumption that getting students to perform oral self-care at home in a particular manner (a subobjective), is directly linked with attainment of the dental health ultimate objective. This assumption may or may not be true, as appears evident from disagreements in the dental literature and variation over the years in recommended home oral hygiene practices. Rather, the criterion of effectiveness needs to be the extent to which the educational program induces people to take the actions it advocates. From my preceding remarks, it should be evident that program planning and evaluation should include specification of program

components, including validity assumptions, both to account for a given program outcome and to provide essential information for program improvement.

SUGGESTIONS FOR FUTURE STUDIES

Based on the analysis presented in this paper, a number of areas seem to warrant further research study, among them the following:

1. The effect of parental involvement in dental health education programs, including the usefulness of various methods to induce such involvement.
2. The impact of various communication sources: classroom teacher, dentist, hygienist, etc. on acceptance and application of preventive recommendations.
3. Information acquisition *vs* motor skill training — how much of each is necessary/optimal for improving home oral care?
4. Use of behavioral science technology to improve both initial and sustained program outcomes.
5. Application of program evaluation models both to planning of programs and analysis of their outcomes.

In closing, may I suggest that to exploit fully the potential of dental health education in the schools, the combined efforts of many groups — teachers, health educators, parents, dental professionals, and behavioral scientists — are needed, drawing upon the unique competencies and insights of each.

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Critique of Haefner's Paper

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It is hard to be critical of a paper that so closely reflects my own thinking and conclusions. In fact, I find very few statements in Haefner's paper with which I vigorously disagree. All of the potentials for dental health education specified by Haefner are certainly present in the school setting. That these potentials are seldom realized stems from a number of sources. Teachers rely on traditional teaching procedures, unaware that developing the *behavioral potential* for dental health may involve basically different techniques. A second deterrent to the total effort may be that the school represents only one of the important components of the total effort.

ISSUES RELATED TO HEALTH EDUCATION

There are however, one or two of Haefner's statements which I accept with reservation. Because I am one of the authors who has emphasized the importance of compliance and identification, I feel compelled to defend my stand and to show how those of us using identification in the manner that we have, do not neglect the insights that are derivable from Kelman's formulation.

Identification and Internalization

Our differences appear to me to be semantic. Kelman's definitions are narrow and specific to Kelman's frame of reference. For example, "compliance" has no particular social science significance except by Kelman's special designation. Compliance is "temporary behavior," a necessary prerequisite perhaps to acquiring a new behavior. On the other hand, "identification" is an old and accepted social-psychological concept describing a well-studied and defined socio-psychological phenomenon of individuals and groups. Moreover, "identification" does not describe only positive relationships. Briefly, the *Modern Dictionary of Sociology* defines a positive "identification as a social-psychological process involving the assimilation and *internalization* of the values, standards, expectations or social roles of another person or persons into one's own behavior and self-conception." * It is in this sense that I have used "identification." A basic assumption of my own research is that identification does not occur by simply adopting behavior like that of another person or group for the purpose of maintaining a positive relationship. Identification may occur where negative relationships exist. If one identifies negatively with an individual, the standards, interests and values of that individual are rejected, and very often the values subsequently assumed by the

identifying person are the opposite of the negative identification. Identification, then, is not merely imitation, it is a process involving incidental learning, modeling and observation which culminates in internalization or introjection of social, psychological and cultural values.[14]

When Bartlett discussed internalization as occurring at the case individuals accept "influence because the attitude or behavior being induced is consistent with the individuals own value system," he was almost on target, but not quite. Rather, internalization of a value had already occurred. Moreover, what if the identification happened to be negative? It would scarcely be consistent with the individual's own value system. Moreover, as Bartlett has stated, studies of school dental health education provide rather ephemeral evidence showing that school dental health education is likely to result in student acceptance of its content only on the part of those already predisposed to do so, thereby suggesting that only those already holding good dental health as a value are influenced in their behavior.

Dental Health as a Value

The problem of inculcating good dental health practices, as I see it, is multifaceted, with "value" at the core. One of two situations usually exists: (1) if dental health is held as a value, then the problem becomes one of changing behavior so that it is congruent with the value held or (2) if dental health is not valued, then the problem becomes one of establishing a value where none had existed before. We need to know more about value systems of students and their function, their hierarchy of values, and the attributes of a value that would promote a change in behavior. Health values in particular are of a generational nature. Few people from any social class would admit that maintaining health is unimportant. Enough even might admit that teeth are too important. We, point is that people claiming to all sincerity to hold similar values disagree on the specific norms embracing those values. The value systems of people are shaped by their social and cultural norms. Even if everyone were to attach dental health as a value, their dental practices and related behaviors could vary in accordance with group norms or social statuses. For example, a study of dental hygiene and socio-economic status revealed that the higher the social class, the more positive is parental example and the more directly it is related to the children's dental health practices.[15]

Dental Health as a Right

To remove the barrier of social class differences, a major educational effort ought to be that of establishing a dental health value as a "right." A "right" which is not dependent upon perceived vulnerability, perceived efficacy of taking preventive action, or subjective consensus

dentist and is the passive recipient of the dentist's expertise. In order to effect any meaningful change in the patient's behavior, he must become an active participant with the dentist in his own health care. Weisenberg has suggested that a contract management approach to dental care be taken.[25] This approach involves specifying what each of the parties will do in dealing with the patient's health care. It specifies definite goals and obligations. The behavior of each party becomes contingent upon the behavior of the other. For example, the dentist might not carry out some procedure until the patient reached a predetermined goal in his oral health behavior.

Another aspect of the dentist-patient relationship is the nature of the controls which the dentist attempts to invoke. Aversive control appears to be the easiest type to use. The dentist can tell the patient about all of the terrible things that will happen to his mouth and berate him for not reaching the goals of cleanliness set by the dentist. Sometimes this technique will work. More often it will not. The patient may become discouraged or defensive and avoid further contact with the dentist. It would seem that reward in the form of praise for whatever the patient has accomplished would be more effective. It will leave him open to further encouragement to improve his performance.

I would like to comment on the use of fear appeals to change behavior. Studies by Janis and Feshback [7] and by Leventhal and his co-workers [12] showed that fear appeals coupled with information about how to avoid the feared consequences lead to an expression of greater intent to carry out the desired behavior. However, the Houston and Alabama studies which used a behavioral criterion of change, that is — plaque indices, found that fear appeals produced no greater change in behavior than merely providing the appropriate information about how to keep one's teeth clean.[5,17] The verbal measures of intent tended to match the results of the earlier studies.

I think the personality characteristics and the attitudes and beliefs of the dentist are of prime importance in initiating change in the patient's behavior. I doubt that these characteristics are of importance as far as the information the patient receives or what he learns. They are likely to be of importance in motivating him to carry out the appropriate behaviors. If the dentist is cold and aloof, talks down to the patient, or conveys the impression that he would rather be on the golf course than in the office, the patient is going to get the message and be less likely to want to cooperate. If the dentist conveys feelings of warmth and genuine concern about the patient's health needs, the patient is more likely to respond with cooperation.

Techniques of Behavior Change

Finally, in this section, I would like briefly to discuss techniques of attitude and behavior change. A substantial literature exists in social

psychology dealing with attitude change in the laboratory. Unfortunately, most of this work, like that with the fear appeals, has dealt only with changes in verbally expressed behavior and not with changes in action. Recently, more emphasis has been placed on actual changes in behavior and I would like to mention two such approaches.

The first is that of the belief congruence approach of Rokeach. He maintains that people hold widely disparate values without recognizing that many of them are inconsistent with each other. He has developed a list of values which people are asked to rank from most important to least important. The inconsistency between values is then pointed out in order to induce behavior change. He has demonstrated some success in getting people to become active in civil rights activities with this approach.[14]

Another technique which has proved somewhat successful in changing behavior is the behavior rehearsal method of Meichenbaum. Essentially, the method involves taking part of an individual's daily routine, inserting the desired behavior in the list of behaviors and having the individual visualize and mentally rehearse each of the behaviors in the list. Meichenbaum has demonstrated the efficacy of this method in a number of different contexts.[15]

Both of these techniques appear to be readily adaptable to the context of influencing oral hygiene behavior. I will discuss one such attempt to use them later. Undoubtedly, more techniques will be developed as behavioral scientists direct their energies toward dealing with real-life problems.

FUTURE RESEARCH NEEDS

And now let us move to the last specific question: What research do we need to demonstrate the effectiveness of what we know?

First, we need research which evaluates the effectiveness of methods for inducing change in oral hygiene behavior. We need to know just how much is achieved by careful education and training of child and adult patients in oral care. We need to know whether or not the use of various behavior change techniques really add anything to training and gentle persuasion. I am convinced that the dentists who have written enthusiastically about their preventive dental practices have indeed influenced their patients. However, it is not clear how they have done this. What kinds of selective factors operate to limit their patient population to those who will benefit? How do their patients really compare with other patients who are just like them but are not urged by their dentists to practice good oral hygiene? We need the answers to these questions.

These issues raise the problem of controls for evaluation. We need to know in evaluating any given approach to behavior change that we are not merely dealing with patients who are essentially self-selected

because they are more concerned about health care than are other patients. After giving this problem considerable thought, I have come to the conclusion that we cannot answer these questions by investigating patients in different kinds of dental practices. We must go out, find our own populations to study, and conduct field experiments to evaluate these issues. In this way, we can at least be sure that we are not confounding patient characteristics with the other phenomena we wish to evaluate.

Another major area which needs careful investigation is that of the relationship between personality characteristics of dentists and those of their patients. This particular issue bothers me because as a researcher I know that it is a very difficult one to handle. However, the issue is an important one to me as a clinical psychologist. I do not know to what extent characteristics of the dentist are important in influencing patient behavior. I would like to know to what extent the beliefs and enthusiasm of the dentist for promoting preventive behaviors play in influencing those behaviors. I believe that they are very important but I do not have any real data on the matter.

The personality characteristics of patients may play an important role in their susceptibility to behavior change. For example, a recent study I conducted evaluated a number of patient dimensions in relation to response to restorative dental procedures. One of these dimensions was locus of control, that is, the extent to which a person believes he has some control over the events in his life.[19] This particular characteristic was negatively correlated with stress responses to the dental procedures. Patients who feel they are largely at the mercy of external forces, then, apparently experience the dental situation as more stressful. Based on these results, I suspect that patients who believe they *can* effect some change in their own destiny would be easier to influence in the promotion of good oral hygiene. However, this kind of evaluation remains to be done.

An Example of an Evaluation Paradigm

I want to conclude by discussing a study which I think is something of a paradigm for the kind of evaluative research we need. It is a behavioral study being conducted with the Buffalo Caries Project. Dr. Judith Albino is directing the research. The purpose of the study is to evaluate the effects of toothbrushing and flossing instruction and two methods of behavior change designed to induce such behaviors. The dependent variables are plaque and gingival indices obtained by both a dental hygienist and from color slides of the labial surfaces of the teeth and gingiva.

The subject population consists of 200 students in the seventh grade of Buffalo schools. They were randomly assigned to four different groups of 50 each. The basic study design is shown in Table I.

TABLE 1

DESIGN OF THE BEHAVIOR CHANGE
STUDY IN THE HOT ALO CARIES PROJECT

	Group 1 Control	Group 2 Instruction	Group 3 Belief Congruence	Group 4 Behavioral Rehearsal
A.	*Baseline plaque and gingival measures - all groups*			
B.	No treatment	Training in brushing and flossing		
		Three week interval		
C.	No treatment	No treatment	Induction 1	Induction 1
		Five week interval		
D.	No treatment	Training in brushing and flossing continued		
		Three week interval		
E.	No treatment	No treatment	Induction 2	Induction 2
		One week interval		
F.	*Posttest I - Plaque and gingival indices - all groups.*			
		Five week interval		
G.	*Posttest II - Plaque and gingival indices - all groups.*			
		Six week interval		
H.	*Posttest III - Plaque and gingival indices - all groups.*			

The control group received only baseline evaluations and will receive the posttest evaluations. The second group merely received instruction in toothbrushing and flossing on two different occasions. I should point out that this is individual instruction with correction and a lot of encouragement.

The third and fourth groups in addition to the instructional procedure received a method of behavior change induction which is interspersed at two intervals between the instructional procedures. These were also done individually. The third group received a variation of the Rokeach belief congruence approach in which they ranked a series of beliefs of some consequence to seventh graders. Inconsistencies between highly ranked values and behavior were then used to induce oral hygiene behavior. The fourth group received a version of the behavioral rehearsal approach of Meichenbaum in which toothbrushing and flossing were inserted as salient activities in preparation for going to bed. In addition, schedules were sent to these children to be placed in the medicine cabinet to keep a record of their brushing and flossing behavior.

Following the final induction procedures, plaque and gingival indices will be obtained after one week, six weeks, and 12 weeks. The time intervals of Groups 1 and 2 were locked to those of 3 and 4 since we were primarily concerned with the behavior change techniques. We will be able to determine the relative effectiveness of each of our procedures in reducing plaque and gingival irritation. The study is approximately two thirds completed at this time. Any positive findings would indicate

that the procedures we have employed could be readily introduced into a dental practice. It should also be noted that no dentist is involved in the conduct of this study. Any potential applications could be carried out by auxiliary personnel.

This particular research is not without some specific shortcomings. However, it is our opinion to more similar work done in the past. I hope we see a good deal more research like this in the near future. We need the information.

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University College of Dentistry have been engaged in a school program which, with great talent and ingenuity, virtually saturates one elementary school with dental health education facts and practices. Dental health verbalization by the children of that school is as good as, if not better than, that in any school or any setting. This has not, by one iota, reversed or improved the declining pattern of dental care in that school.

My experience with the mass media leads me to believe that they are quite effective in influencing the selection of a course of action once the individual has been motivated to act. I see these media as exerting very little influence over the decision to act per se. Unfortunately, mass media are also asflicted with a tendency to induce the consumer to substitute an easier albeit less desirable alternative. For example, why brush your teeth if a mouth wash will do the job, or why visit a dentist if you brush with *X* dentifrice?

The undistinguished record of behavioral scientists engaged in the quest for predictable techniques to influence dental health behavior or even for parameters of success must invite some uncomfortable decisions when subjected to the scrutiny of cost effectiveness. How much, in the face of scarce resources and the need for direct services, are we to be prepared to invest in uncertain research? In many ways it is a re-expression of John Galbraith's dilemma in his definition of diplomacy as "not the art of the possible, but the choice between the unpalatable and the disastrous."

Comments

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As is generally the case, my reaction is predicated on my abilities to understand the content of the papers within the context of my previous experience. I concur with my fellow reactors in that I found the papers to be extremely well done and the critiques to be supportive in their constructiveness when theory was in conflict. My principal concern is that we tend to complicate through fragmentation the solution to influencing positive preventive dental health behavior.

Although we do not have a perfect insight into all the ramifications of the causative factors in dental caries, there are experts that contend that between mechanical plaque control, judicious utilization of fluorides, and good eating habits, we can literally overkill the disease. The latter applies in great part to periodontal disease as well. Since dental caries and peridontal disease account for in excess of 98 percent of all tooth loss and since both are believed to be caused from the products of bacterial plaque, I refer to the prevention of these two disease entities

when referring to preventive dentistry. Adequate dental health is nothing more than the preservation of the teeth and their supporting tissues in a functional disease-free state. At its basic level, preventive dentistry is saving teeth.

Realistic vehicles to generate awareness, transfer information, and train to skills do exist. Although the available methods are improving at a shocking rate, they are presently more than adequate if applied within the framework of a nationally organized campaign. As I noted earlier, a general fragmentation in the application of the principles of the above needs is the foremost barrier. We are, as John Hein stated sometime ago, lacking in a *Master Plan for Dentistry*. As a simple example, the American Dental Association, the American Society for Preventive Dentistry, the American Academy of Periodontology, the American Society of Dentistry for Children, and HEW, to mention but a few that come to mind immediately, are all supplying preventive dentistry messages to the mass media. Grade school programs such as presented by Den-Tal-Ez (ToothKeeper), ADA, Proctor & Gamble, and Colgate, again to mention but a few, are being implemented to a greater or lesser degree throughout the nation. Certainly the success of the American Society for Preventive Dentistry indicates an in-office concern for acquiring the methods to prevent dental disease. To say that the above are fragmented, confused, disorganized, conflicting, and wasteful, would be a gross understatement. We simply haven't put it together. It is somewhat discouraging to note that research has provided us with the necessary tools. Behaviorists have the vehicles and methods to adapt the tools but because of disunity of application,Americans are generally in an abominable state of dental health.

To my knowledge, the administrators of the Dental Health Center in San Francisco put together the only comprehensive mass media program in an attempt to prevent periodontal disease. They developed an ambitious campaign only to find that funds were not available for execution. Then, as the government is wont to do, the decision was made to close the Dental Health Center. This is just one more example of the disunity that exists. Because vested interests present such monumental barriers, I see no force on the horizon capable of solving the problem of fragmentation.

In summary, although the papers were excellent and the critiques meaningful, I see them only as an academic exercise. All of us who are concerned with the prevention of dental disease must work with solidarity and unity in applying the many valid principles that were presented. Perhaps I am too optimistic, but the government and specifically the Division of Dentistry could one day pull it all together.